Engineering Factual

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Capsizing of the U.S. Small Passenger (Charter Fishing) Vessel Taki-Tooo in the Pacific Ocean Near the Entrance to Tillamook Bay, Oregon On June 14, 2003

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Vessel Description

The *Taki-Tooo* was built by *Modutech Marine,* in Tacoma, Washington in 1977. The Taki-Tooo was constructed of fiberglass-reinforced plastic, essentially of wood framing and plywood covered with fiberglass. The principal characteristics of the *Taki-Tooo are summ*arized below:

Length:	32.5 feet (Length overall measured on scene: 35.8 feet)
Beam:	12.33 feet (Beam measured on scene: 12.33 feet, excluding rub rails)
Depth:	5.3 feet
Gross tonnage:	14
Main Engine:	250-horsepower John Deere model 6076AFM30 turbocharged diesel engine, Serial/Identification numbers: DENSO RE71552 NDPES6NB120C720RND325 09200-32501-0350092

Accident Summary

About 0605 on the morning of June 14, 2003,[1] the U.S. charter fishing vessel *Taki-Tooo* departed the marina at Garibaldi, Oregon, with 17 passengers and 2 crewmembers on board. The vessel proceeded to an area between the jetties at the seaward entrance to Tillamook Bay, where the master waited for an opening in the ocean swells to navigate the hazardous bar. About 0715, the *Taki-Tooo* left the inlet, turned to the north, and encountered a wave that capsized the vessel. The master and 10 passengers died. The deckhand and 7 passengers either washed or swam ashore on a nearby beach and survived.

Accident Narrative

On June 14, 2003, about 0605, US Small Passenger Vessel (charter fishing vessel) *Taki-Tooo*, with a crew consisting of a master and deckhand, and 17 passengers, departed the boat harbor in Garibaldi, Oregon for a day of fishing in the Pacific Ocean. Prior to

[1] All times are Pacific daylight time, based on the 24-hour clock.

departing, the captain provided a safety briefing to the passengers about the location and donning of lifejackets and other safety equipment. During the briefing, the captain informed the passengers that the vessel would not carry any crab pots that day because of the large swells at the bar and expected rough sea conditions. The trip from the boat harbor along the channel through Tillamook Bay was uneventful.

Because of large breaking waves at the entrance of Tillamook Bay, the Coast Guard had imposed restrictions on recreational vessels that prevented them and uninspected small passenger vessels (carrying up to six passengers) from leaving the Bay[2]. As the *Taki-Tooo* approached the jetties leading out of Tillamook Bay, there were three other charter fishing vessels (*Oakland Pilot, Norwester* and D&D) and a 23-foot commercial fishing vessel (*Amanda)* waiting inside the jetties for the waves to subside. A Coast Guard motor lifeboat, MLB 47210, was standing by near the Coast Guard observation tower on the north jetty to enforce the restriction on passage of recreation vessels and uninspected small passenger vessels.

At the time it was near the end of the ebb tide and it was expected that the sea conditions would improve after the tide stopped ebbing. About 0650 the *Norwester* proceeded outbound on a north northwesterly course across the bar.[3] A short time later the *Oakland Pilot* proceeded outbound, also on a north northwesterly course. A few minutes later, the D&D, a similar size vessel to the Taki-Tooo, proceeded outbound, also following a north northwesterly course. At the time, the *Taki-Tooo* and *Amanda* were still waiting to proceed outbound.

About 0715, the Captain of the *Taki-Tooo*, after observing the incoming waves, elected to proceed out across the bar following a northwesterly course; however, his turn to a northerly direction started at point closer to the tip of the north jetty than the

[2] Thirteenth Coast Guard District Standard Operating Procedures of April 19, 2002, issued pursuant to 33CFR177, set up procedures for restricting recreation vessels and uninspected passenger vessels carrying up to six passengers from going to sea when bar or sea conditions are hazardous.

[3] A sand bar lies across the entrance to Tillamook Bay which causes the incoming ocean swells to crest and break as the water depth decreases, preventing vessels from proceeding due west during large swells. The masters interviewed cited that depths across the middle ground, the bar lying west of the jetties, were too shallow for safe passage unless the sea was very calm.

preceding three charter fishing vessels. The deckhand later stated that the *Taki-Tooo* encountered two very large waves as they proceeded out. She estimated the first large wave at about 9 to 10 feet high and the second large wave at 12 to 15 feet high. According to the deckhand, the Captain put the propeller in reverse[4], while meeting the first of the two large waves. The deckhand stated that as the vessel came down the back side of the first large wave, the vessel turned to the right to a northerly heading which placed it broadside to the oncoming second large wave. According to the deckhand, the second large wave broke before reaching the vessel, then struck the vessel on the port side capsizing the vessel. By the time the vessel capsized it had passed to the north of the north jetty.

The operator of the *Amanda* stated that he was watching the waves for an opportunity to go out and stated he saw the same opening or lull in the waves that he believed the captain of the *Taki-Tooo* saw and it appeared to him that it was a reasonable time for the *Taki-Tooo* to move out. The *Amanda* operator said that within about six seconds of the *Taki-Tooo* captain applying power to go out, two very large waves appeared. He stated that the *Taki-Tooo* went over two large swells before encountering the first of the two very large waves. The operator stated that the primary swells were from the west, and that there were also some swells from the southwest and occasionally some swells from the northwest.

The deckhand who was on the flying bridge with the captain survived. One passenger on the after deck, who was a good swimmer, survived and one passenger on the after deck was washed into the cabin during the capsizing, raising the number of passengers in the cabin to seven. Of the seven passengers trapped in the cabin, 6 managed to acquire life jackets, and exit the inverted cabin through windows and the cabin door and survive, although one survivor lost his life jacket after exiting the vessel. The captain and 10 of the passengers, including one passenger inside the cabin, perished for a total of 11 lives lost.

[4] Other operators stated that an operator heading toward a large wave might "throttle back" i.e. reduce engine speed, but none acknowledged having reversed the propeller.

Investigation

The propulsion group's on-site investigation began on Sunday, June 15, about 1000. The group consisted of the group chairman from the NTSB Anchorage Regional Office, a chief warrant officer from the United States Coast Guard, and a deputy sheriff from the Tillamook County Sheriff's Office. All members of the group were present.

The small passenger vessel *Taki-Tooo* was on a sandy beach, resting generally upright, principally on its keel, with a port list. The vessel was positioned slightly above the high tide line, about 200 feet from the waters edge. The vessel had been secured on the beach via a line from the vessel's bow to a truck and it had been dragged up on the beach above the waterline, some three times as the tide came in. The flying bridge and controls were missing, apparently lost during the accident sequence. Bare control cables for the upper helm station were exposed and no steering components remained where the upper helm station had been. The railing around the foredeck was bent and partially broken loose from the hull. The engine compartment and cabin contained considerable sand, much of which was removed by shoveling by the owner of Garibaldi Charters and another man. The *Taki-Tooo* was lifted onto a flat bed truck and moved to another location for further inspection.

Inspection of Propulsion and Machinery

Sand filled much of the bilge section, and portions were removed from the engine compartment and cabin of the vessel by the team to facilitate inspection. The vessel was equipped with one bilge pump, manufactured by Peters and Russell. It was a reciprocating bellows-type pump, belt driven by a 12-volt electric motor. The pump was connected to a three-valve manifold, with bilge suctions located in the lazarette, engine space and bow compartment. Thus, the pump could take suction from any of these three locations. At the time of the inspection, the manifold valve for the lazarette was open. All three bilge suction hoses were still connected. The bow suction hose appeared to be damaged or deteriorated and did not have a suction strainer on the end of it. The strainer

could not be found in the sand filled bilge. The remaining two bilge hoses were intact with unobstructed strainers at their pickup ends. The bilge pump was removed, and attached to an independent 12-volt power source. The pump ran immediately and rapidly, with a small amount of water exiting from the discharge side of the pump. The *Taki-Tooo* had two high-water bilge alarms located in the engine compartment and the lazarette. Both switches were still connected to their respective bilge alarm wiring. Each switch tested normally.

The *Taki-Tooo* was powered by a single six-cylinder diesel engine manufactured by John Deere. The 250-horsepower engine was turbocharged. The engine was coupled to a transmission and 1-3/8 inch diameter propeller shaft. This shaft extended through the hull without a supporting strut. The shaft was coupled to a single four-bladed, 26-inch diameter bronze propeller. The propeller had a 22.6-degree pitch and was right handed (rotated clockwise). The propeller was found mounted solidly on the shaft. The retaining follower was present and snug. All four of the propeller's blade tips were uniformly bent in the forward direction.

The engine was secured solidly on its mounts and mounting rails. The transmission was similarly in place. The engine was intact, with no engine case or turbocharger penetrations. There were no signs of oil leaks. The throttle and transmissions control were manipulated at the lower helm station, and they moved the throttle linkage throughout its range, and selected forward, neutral, and reverse on the transmission. The stub shaft from the engine to the transmission, and the drive shaft from the transmission to the propeller, were all mated at their respective companion flanges and were undistorted. The propeller shaft was straight and unremarkable. The propeller was rotated, and the drive shaft was observed to rotate along its entire length.

All fuel lines, fittings, and linkages were intact and attached. The two, 150-gallon capacity fuel tanks were securely mounted near the stern of the boat. There was no evidence the tanks had been breached. The fuel lines were connected at the tanks and

the engine, without a breach. The Racor-brand fuel strainer filter appeared clean, and the bowl of the filter disclosed no particulate contaminants, or water.

The rudder and rudderpost appeared to be solidly mounted and undamaged. The rudder was moved from stop to stop. The movement was uniform throughout its travel. The lower helm station wheel turned freely and caused a power steering like fluid to discharge from the severed control lines when moved.

Electrical fuses in the cabin located behind the lower helm station were intact. Several were filled with water.

The group did not discover any evidence of any pre-accident mechanical malfunction during the inspections of the propulsion and steering mechanisms.

Removal of Equipment for Examination

1. Investigators had the radar/chart plotter removed and sent to the Safety Board's recorder laboratory in Washington, D.C. for examination for possible retrieval of trackline data. (See future lab reports.)

2. Also the propeller was removed and sent it to the Safety Board's materials laboratory in Washington, D.C., for detailed examination and documentation of damage. (See future lab reports.)